



# **Intel® Fortran Compiler**

## **Installing and Getting Started**

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# 1 About This Guide

This guide helps you get started using the Intel® Fortran product. It describes installing Intel Fortran, post-installation tasks, using Intel Fortran, and documentation and technical support resources. This guide assumes that you are familiar with the Fortran programming language, the Intel® processor architecture, and your Windows\* operating system environment.

It contains the following chapters:

- Chapter 1, About This Guide

The chapter you are reading describes the contents of this guide, related publications, and conventions used in this guide.

- Chapter 2, Prerequisites for Installing Intel Fortran

This chapter describes the system requirements and software requirements for installing Intel Fortran, the Intel® EDB debugger, and Intel® Array Visualizer. It describes installation options and provides information about specifying the license file.

- Chapter 3, How to Install Intel Fortran

This chapter describes the step-by-step installation procedures for installing Intel Fortran and Intel Array Visualizer.

- Chapter 4, Post-Installation Tasks

This chapter describes post-installation tasks required to use Intel Fortran, including understanding the program folders, how to reinstall or remove Intel Fortran or Intel Array Visualizer, restrictions related to using Compaq\* Visual Fortran project files, and how to register and check for Intel Fortran service update kits.

- Chapter 5, Using Intel Fortran

This chapter shows how to use Intel Fortran, including the command-line environment, using the Microsoft\* Visual Studio.Net\* development environment, using the Fortran build tool within the Microsoft Visual C++\* 6 development environment, using debuggers, brief information on using Intel® Array Viewer, and such product features as the Fortran 95 language and the library interface definitions provided by Intel Fortran.

- Chapter 6, Documentation Road Map

This chapter provides an overview of the online (on-disk) documentation for Intel Fortran, Intel Itanium®-based Assembler, Intel Array Visualizer, and the Compiler Performance Tutorial.

- Chapter 7, Technical Support

This chapter provides an overview of Intel Fortran technical support and describes the use of the Intel information reporter tool that you can use to provide system information when requested by the Intel technical support team.

## Related Publications

The Intel Fortran and Intel Array Visualizer documentation includes the following:

- *Intel® Fortran Compiler User's Guide* (for Windows\* Systems)
- *Intel® Fortran Programmer's Reference*
- *Intel® Fortran Library Reference*
- *Intel® Array Visualizer online documentation, Intel® Array Viewer online documentation*
- *Enhancing Performance with Intel® Compilers* (interactive training)
- *Using the Intel® License Manager for FLEXlm\**
- *Release notes* for Intel Fortran
- *Release notes* for Intel Array Visualizer

For more information about Intel Fortran and Intel Array Visualizer documentation, see Chapter 6.

For software requirements and last-minute information about this release, please read the release notes. You can read the release notes before you install Intel Fortran (see “Reading the Release Notes Before Installation” in Chapter 2).

In addition to the documentation provided with Intel Fortran, Intel provides architecture documentation, which you can view or download from the following Internet Web site:

<http://developer.intel.com/>

For example, the following are some of the pages about the Intel architecture.

For information about the ...	Click:
Intel® Xeon™ processor	<a href="http://developer.intel.com/design/Xeon/">http://developer.intel.com/design/Xeon/</a>
Intel® Pentium® 4 processor	<a href="http://developer.intel.com/design/Pentium4/manuals/">http://developer.intel.com/design/Pentium4/manuals/</a>
Intel® Itanium® processor	<a href="http://developer.intel.com/design/itanium/manuals/">http://developer.intel.com/design/itanium/manuals/</a>

## 2 Prerequisites for Installing Intel® Fortran

This chapter describes the steps you need to take to ensure that your installation of Intel® Fortran will be successful.

### System and Software Requirements for Intel Fortran

Before you install Intel Fortran and its related software, make sure that your system meets or exceeds the hardware requirements and has the required software installed.

You can build applications for Intel® Itanium®-based systems running Windows\* operating systems. To do this, you need to select and install the Intel Fortran Itanium-based compiler during installation when using either:

- an Itanium-based system running a Windows operating system.
- an IA-32 system running a Windows operating system.

You can build applications for IA-32 systems running Windows operating systems only from:

- an IA-32 system running a Windows operating system. To do this, you need to select and install the Intel Fortran IA-32 compiler during installation.

If you have the necessary software installed, you can choose to install both compilers on the same IA-32 system, so you can build applications for both Itanium-based systems and IA-32 systems.

The following table summarizes the type of processor systems and the methods you can use to build applications for IA-32 or Itanium-based systems running Windows operating systems.

To build applications for:	On this type of system:	You can use any of the following methods:
IA-32 systems	IA-32 system	<ul style="list-style-type: none"><li>• The command line (including makefiles).</li><li>• For systems where the Microsoft* Visual C++* 6 development environment (see Chapter 5) is installed, a separate Intel Fortran compiler build tool.</li><li>• For systems where Microsoft* Visual Studio.Net* is installed, a subset of the .Net build environment.</li></ul>
Itanium-based systems	IA-32 system	<ul style="list-style-type: none"><li>• The command line (including makefiles).</li></ul>
Itanium-based systems	Itanium-based system	<ul style="list-style-type: none"><li>• The command line (including makefiles).</li></ul>



**Note:** The Intel Fortran Compiler 7.0 can coexist on the same system with the Compaq\* Visual Fortran 6.x or Intel Fortran Compiler 6.0 products. For example, if you use the command line tools for any of these products, please make sure that the PATH, LIB, and INCLUDE environment variables are set up correctly for the product you are using. However, to use Compaq Visual Fortran in the Microsoft Visual C++ 6 development environment (Developer Studio\*), you can prevent installation of the Compiler Build Tool by selecting a Custom installation and deselect the item Build Tool Files. For more information, see Chapter 5 and the release notes.

## IA-32 Processor Requirements to Build IA-32 Applications

Before you install Intel Fortran on the IA-32 system where you will build applications for IA-32 systems, ensure the system meets the following minimum requirements:

Processor	Intel Pentium <sup>®</sup> , Intel Xeon™, or subsequent IA-32 processor (Intel Pentium 4 or Intel Xeon processor recommended).
RAM	128 MB (256 MB recommended).
Disk space	250 MB, plus an additional 300 MB during installation for download and temporary files.
Virtual memory page file size	At least 100 MB. Be sure to use at least the minimum amount of virtual memory recommended by Microsoft* Windows*.
Operating system	For a list of supported Windows operating systems, please see the online release notes.
Development environment software	For a list of development environments, please see the online release notes.

## IA-32 Processor Requirements to Build Itanium-based Applications

Before you install Intel Fortran on the IA-32 system where you will build applications for Itanium-based systems, ensure the system meets the following minimum requirements:

Processor	Intel 350 MHz Pentium II or subsequent IA-32 processor (Pentium 4 processor recommended)
RAM	256 MB
Disk space	250 MB, plus an additional 300 MB during installation for download and temporary files if the IA-32 compiler is not installed.
Virtual memory page file size	At least 100 MB. Be sure to use at least the minimum amount of virtual memory recommended by Microsoft Windows
Operating system	For a list of supported Windows operating systems, please see the online release notes.
Development environment software	For a list of development environments, see the online release notes.

To run an executable built for an Itanium system, the Itanium system to which you copy the executable should have at least 512 MB of RAM, be running the Microsoft Windows XP for Itanium-based systems operating system, and have an adequate page file size.

## Itanium Processor Requirements to Build Itanium-based Applications

Before you install Intel Fortran on an Itanium-based system where you will build applications for Itanium-based systems, ensure the system meets the following minimum requirements:

Processor	Intel Itanium or Itanium 2 processor
RAM	512 MB (1 GB recommended)
Disk space	150 MB, plus an additional 300 MB during installation for download and temporary files.
Virtual memory page file size	Be sure to use at least the minimum amount of virtual memory recommended by Microsoft Windows
Operating system	For a list of supported Windows operating systems, please see the online release notes.
Development environment software	For a list of development environments, please see the online release notes.

## Checking Disk Space and Virtual Memory

To check on the disk space available for a disk on your system:

1. Click My Computer
2. Right click the disk drive where you will install Intel Fortran and select Properties from the pop-up menu
3. View the disk space available

To check on the virtual memory page file size on your system:

1. Display the Control Panel (**Start > Settings > Control panel**)
2. Click the System icon
3. On Windows 2000 and XP systems:
  - Click the Advanced tab
  - Click the Performance Options button
  - View the Virtual Memory size displayed
4. On other Windows systems:
  - Click the Performance tab
  - Click the Virtual Memory button (not needed on Windows NT systems)
  - View the Virtual Memory size displayed (or whether Windows manages virtual memory size)

## **System and Software Requirements for Intel® Array Visualizer**

Intel® Array Visualizer can be installed only on IA-32 systems running the operating systems listed under “IA-32 Processor Requirements to Build IA-32 Windows Applications,” which also lists disk space requirements.

To use Intel Array Visualizer or Intel® Array Viewer, you must have Microsoft Internet Explorer 6.0 or later installed.

To view graphs, your graphics card and monitor need to support a sufficient number of colors, such as 16-bit or higher color. It is also recommended that your graphics card support OpenGL\*.

## **Software Requirements for Intel EDB Debugger**

The Intel EDB debugger does not support Windows 98, Windows 98 SE, or Windows Millennium Edition. It can be installed on other operating systems supported for Intel Fortran for IA-32 systems and Itanium-based systems. On systems where Microsoft Visual Studio.Net is installed, the integrated Visual Studio.Net debugger can be used to debug IA-32 Fortran applications.

## **Understanding Software Components and Your Installation Options**

During installation, you will be asked to respond to certain dialog boxes and make decisions related to installation.

One decision related to disk space requirements includes where the installation files will be installed. For most of the installation files, the default locations are the following directories:

- On IA-32 systems: *C:\Program Files\Intel\*
- On Itanium-based systems: *C:\Program Files (x86)\Intel\*

You can specify that Intel Fortran be installed in a different directory on the same or a different disk, or that certain software components of Intel Fortran be installed in different directories on the same or a different disk.

You can choose to install or not install certain software components, including the following:

- Intel IA-32 Compiler
- Intel Itanium-based Compiler
- Intel EDB debugger
- Intel Array Visualizer

The Intel EDB debugger only runs on Windows NT 4.0 with Service Pack 6, Windows 2000, or Windows XP operating systems (it does not support Windows 98, Windows 98 SE, or Windows Millennium Edition).

To install the Intel Fortran Itanium-based Compiler, you need to have installed the Microsoft Platform SDK.

The installation setup program lets you choose whether to select a Typical or Custom installation type. Both installation types let you choose whether an entire component will be installed on a local disk or not installed. The Typical installation type is sufficient for most users and installs the selected components in the same disk/directory location. The Custom installation type lets more advanced users choose:

- Whether some of the subcomponents of a component will be installed on a local disk (if it has subcomponents)
- Different disk/directory locations for each component

If you also install Intel C++ 7.0, you only need to install the Intel EDB debugger once.

## **Activating the License File**

The Intel Fortran Compiler uses GLOBETrotter\* FLEXlm\* electronic licensing technology. Unless your Intel Fortran license is already active, you need to activate your license before you can install Intel Fortran. Also, the license must remain in place to use Intel Fortran or Intel Array Visualizer.

The default directories that contain license files for Intel Fortran are:

- On IA-32 systems:

```
C:\Program Files\Common Files\Intel\Licenses\
```

- On Itanium-based systems:

```
C:\Program Files (x86)\Common Files\Intel\Licenses\
```

If this license directory does not exist on your system when you install Intel Fortran, the license directory will be created and you will be prompted to specify the license file. You can also copy the license file to the license directory (shown above) before starting installation. License files have a file extension of .lic.

The Intel Fortran license can coexist with some previous versions of the Intel Fortran license. Intel Fortran licensing technology changed with Version 6, so unless your license subscription has expired, Version 6.0 licenses are valid for Intel Fortran 7.0.

If you are using counted Intel Fortran licenses (floating or end-node) associated with GLOBEtrouter\* FLEXlm\* electronic licensing technology, unless your license file and license server are already setup and running, you need to first install the Intel license manager software before you can configure your license server:

1. Open the Intel® Software Development Tools program folder (**Start > Programs > Intel® Software Development Tools**)
2. If not done previously, click: **Intel® FLEXlm\* license manager > Install Intel® FLEXlm\* license manager**. Accept the license agreement, specify the path and name of the license file for your counted license (or choose to specify the file later), and follow other displayed instructions needed to install the Intel license manager software.
3. Once the license manager is installed, click: **Intel® FLEXlm\* license manager > Configure Intel® FLEXlm\* license server**. If you have not done so during installation of the Intel license manager, specify the counted license file. You can then start the license server (click the *Start Server* button or from the Services control applet). For more information, see the online guide *Using the Intel License Manager for FLEXlm\**.

Removing the Intel Fortran compiler does not delete the corresponding license or other Intel license file.

## **Beta Testers: Removing Previous Versions of Intel® Fortran**

If you are using some other versions of the Intel Fortran Compiler 7.0 (pre-beta or beta), uninstall them prior to installing this product. To uninstall more than one component, you may have to uninstall each component individually.

## **Reading the Release Notes Before Installation**

When installing Intel Fortran from CD-ROM media, you can read the release notes before installation. Use a Web browser to open the `frelnotes.htm` file located in the CD-ROM root directory (in the **File** menu, click **Open**, click the **Browse** or **Choose File** button).

When installing Intel Fortran from a Web download kit, the downloaded file is unpacked into an intermediate directory that you specify. You can read the release notes from this intermediate directory by using a Web browser to open the `frelnotes.htm` file (in the **File** menu, click **Open**, click the **Browse** or **Choose File** button).

### 3 How to Install Intel Fortran and its Components

This chapter provides detailed installation instructions for installing the Intel® Fortran compiler and optionally the Intel® EDB debugger. You can install Intel® Array Visualizer separately, after you install Intel Fortran.

Before you use the instructions in this chapter, make sure that you have completed the steps described in the previous chapter.

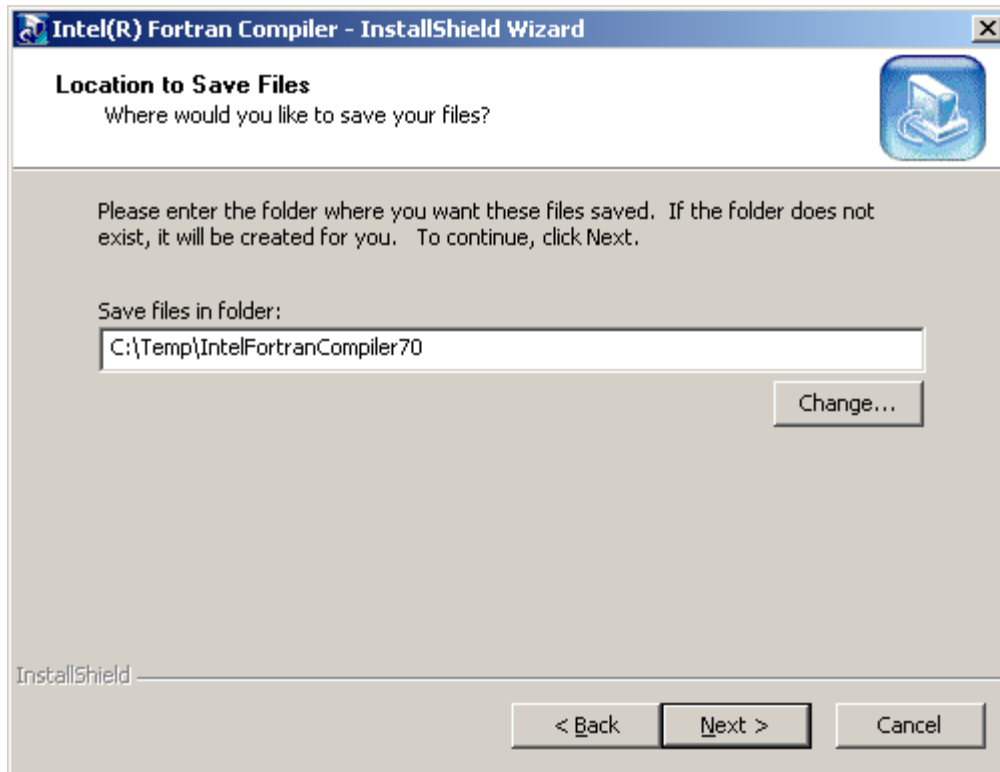
**Note:** On Microsoft\* Windows\* 2000, Windows XP\*, and Windows NT\* systems, you **must** use an account with administrative privilege to install or remove the Intel Fortran Compiler and its components.

If you are installing Intel Fortran from CD-ROM or from the intermediate directory where files were previously unpacked to, please skip to the section “Starting the Installation from CD-ROM or Disk.”

#### **Web Installation: Unpacking the Download File**

With the Web download kit, the downloaded file is unpacked into an intermediate directory that you specify. To unpack the downloaded file:

1. Use Windows Explorer or My Computer to locate the directory containing the downloaded file
2. Double-click the downloaded file to display a screen resembling the following:



3. Specify the location of an intermediate directory where the downloaded files will be unpacked or click the **Change...** button to browse your system and select a disk and directory location. If you are not sure whether there is enough disk space on the disk where Intel Fortran will be installed, choose a different disk.
4. You should remember this intermediate directory for future reference, for example, to free up disk space after installation. You should retain either the downloaded file or the contents of this intermediate directory to reinstall this version of Intel Fortran.
5. Click **OK** to begin copying the contents of the downloaded file into the intermediate directory. A dialog box appears showing the progress of the extracted files. When complete, your Web browser appears, initiating the installation of Intel Fortran.

You do not need to keep both the downloaded file and the contents of the intermediate directory. You need only one of these to reinstall this version of Intel Fortran (see “Removing the Intermediate Download Directory” in Chapter 4).

## Starting the Installation from CD-ROM or Disk

After you unpack the downloaded file, a Web page appears in your Web browser displaying the Intel Fortran name and version number, such as Intel Fortran 7.0 for Windows\* and Intel Array Visualizer for Windows\*.

If you are installing Intel Fortran from CD-ROM, insert the Intel Fortran CD-ROM into a CD-ROM drive. If your Web browser does not automatically appear displaying the Intel Fortran installation page, to display this page, double-click the file name *autorun.exe* in the:

- Root directory of the CD-ROM
- Top-level (intermediate) directory that you selected when you unpacked a Web download of Intel Fortran

This introductory Web page can be activated whenever needed, not only to install or reinstall Intel Fortran, but also for easy access to the helpful Web links displayed in the left margin. For example, links in the left margin allow you to:

- Register for technical support
- Display a page containing relevant Web links
- Access the Premier Support log on Web page
- Display the *Intel Fortran Compiler User's Guide*

If you select one of the links in the left margin, click the **Back** button on your browser or click the link **CD Home** link in the left margin to return to the initial page.

**Note:** Before you start the installation, make sure that you have activated the appropriate license file (see “Activating the License File” in Chapter 2).

To start the installation, click the link **Install Now** on the right side of the title of the desired Intel software. For example:

- To install Intel Fortran, click the link **Install Now** to the right of the name Intel Fortran 7.0 for Windows (see following text)
- To install Intel Array Visualizer, click the link **Install Now** to the right of the name Intel Array Visualizer (skip to the section “Installing Intel Array Visualizer”).

## **Installing Intel Fortran 7.0**

After loading the necessary installation software, the following Welcome dialog box appears:





Click the Next> button to continue.

**Note:** To exit from the Intel Fortran installation setup process, click the Cancel button in the lower right of a dialog box.

If you previously installed Intel Fortran, a dialog box will appear asking you whether you want to repair, modify, or remove Intel Fortran.

If you want to install a newer version, you can choose to remove the previous version first. For example, you must remove beta test versions before installing later versions.

To modify or repair the same version of Intel Fortran, you can select:

- Modify to change whether or not certain components are installed on disk (or where they are installed).
- Repair if you are having problems with the current installation but do not want to change which components are installed on disk.

If this is a new installation of Intel Fortran, the License Agreement dialog box appears:

1. Read the License Agreement. Use the scroll bar to display the entire text.
2. If you agree with the terms of the License Agreement, click the line “I agree with the terms in the license agreement.”

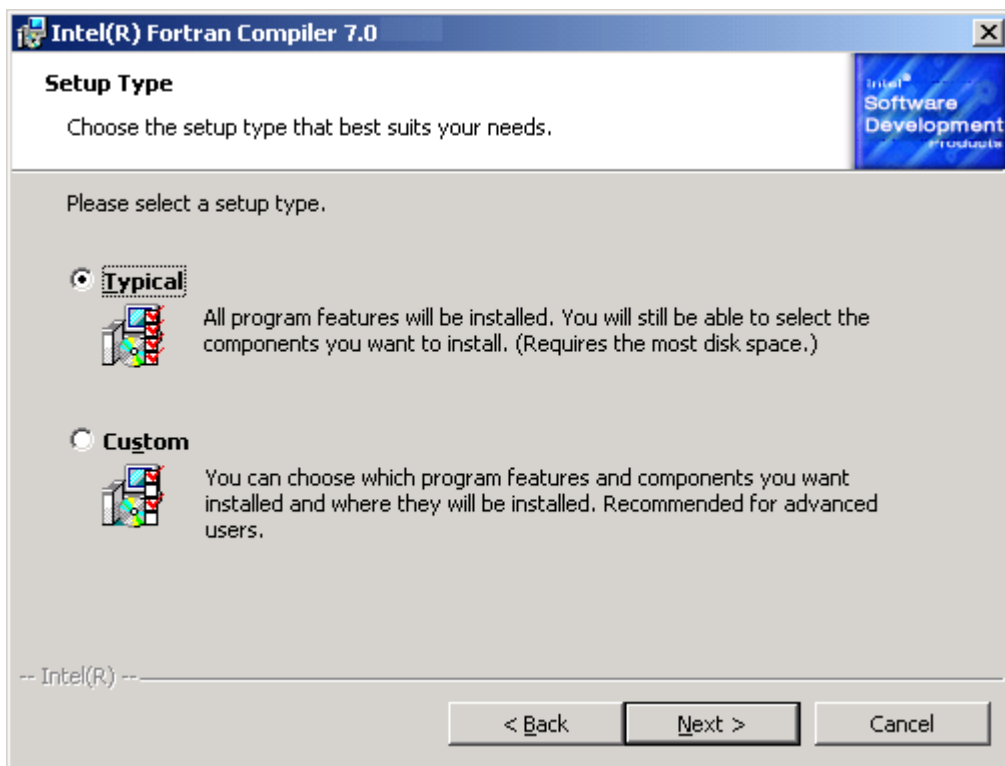
3. Click the **Next>** button to continue. Alternatively, you can click the **<Back** button to display the previous dialog box.

The Customer Information dialog box appears:

1. Enter your name and (if applicable) your company's name.
2. You can also specify whether this installation of Intel Fortran can be used only by the account you are using to perform the installation or by other accounts using this computer system.
3. Click the **Next>** button to continue. Alternatively, you can click the **<Back** button to display the previous (License Agreement) dialog box.

## Setup Type Dialog: Choose a Typical or Custom Installation

The Setup Type dialog box asks whether you want to perform a Typical or a Custom installation:



Select the Typical installation type if you want all possible components installed on your local hard disk. The Typical installation type requires that the entire component and its subcomponents are installed (or not installed) and that all selected components are installed on the same disk/directory location.

If you select the Typical installation type, you can still deselect components (such as the Intel EDB Debugger) if needed, but not subcomponents. Unless you have disk space limitations, most users should select the Typical installation type.

Select a Custom installation if you want control over how the components are installed on your local disk and if you want to select or deselect subcomponents. Using a Custom installation lets you choose:

- To install the entire component on local disk.
- To install some of the subcomponents of this component on local disk (if it has subcomponents).
- To not install the entire component on the local disk.
- To specify the disk/directory location for each component.

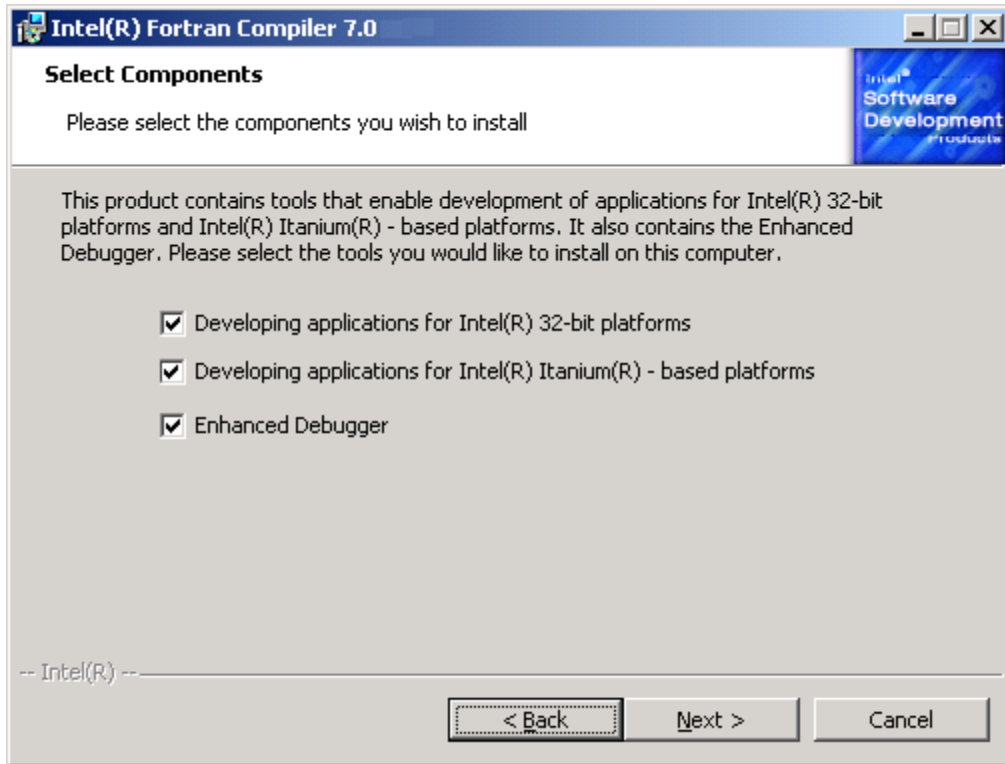
Click on the line for either the Typical or Custom installation type, verify your selection, and click the `Next>` button to continue. Alternatively, you can click the `<Back` button to return to the previous dialog box.

After you select a Typical or Custom installation and press the `Next>` button, the system checks to determine whether you have the software needed to install all components. If prerequisite software needed for a component is not installed, a Missing Prerequisite dialog box appears displaying the Intel Fortran component and the name of the missing prerequisite software. For example, if you do not have the Microsoft\* Platform SDK installed on your system, you should not install the Intel Fortran Compiler for Itanium-based Systems.

If you selected a Custom installation, skip to the section “Performing a Custom Installation.”

## **Performing a Typical Installation**

After you select a Typical installation and (if needed) reply to the Missing Prerequisite dialog box, a Select Components dialog box similar to the following one appears:



The Select Components dialog box lets you select the components (but not subcomponents), including the Intel Compiler for 32-bit applications, Intel Compiler for Itanium-based applications, and the Intel EDB debugger.

If you want to select a Custom installation, click the <Back button to return to the previous dialog box.

Click the line for a component to change whether the component is selected or deselected. When you verify that the appropriate components are selected, click the Next> button to display the Destination Folder dialog box.

The Destination Folder dialog box lets you view the currently selected target installation disk device and top-level directory. On IA-32 systems, the default location is:

```
C:\Program Files\Intel\Compiler70
```

On Itanium-based systems, the default location is:

```
C:\Program Files (x86)\Intel\Compiler70
```

To specify a different directory location, click the Change button, which displays the Change Current Destination Folder dialog box. You can use the Change Current Destination Folder to move up one directory level (icon in upper right), create a new directory (icon in upper right), specify a different disk device (list box under Look in:),

and type in a directory name. Click the **OK** button when you have specified the desired disk and directory location.

After you click the **Next>** button in reply to the Destination Folder dialog box, the Ready to Install Program dialog box appears, allowing you to begin installing the selected components.

In reply to the Ready to Install Program dialog box, click the:

- **Install** button to begin installation
- **<Back** button to return to the previous dialog box
- **Cancel** button to exit the installation setup process

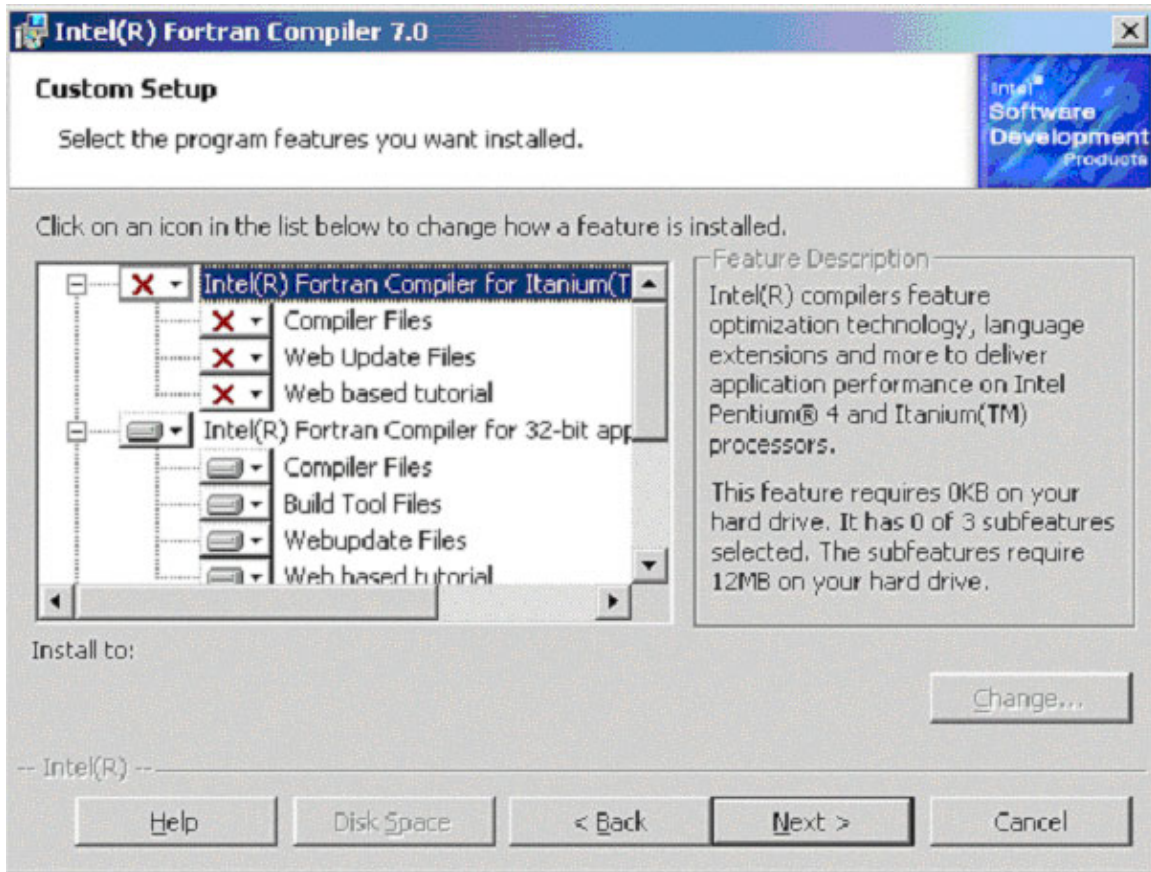
Once you begin installation, files are copied to the target directories. When complete, the InstallShield Wizard Completed dialog box appears:

- Choose whether or not you want to install Intel Array Visualizer after completing the Intel Fortran installation
- Click the **Finish** button to complete the installation of Intel Fortran
- If you requested installation of Intel Array Visualizer, skip to the section “Installing Intel Array Visualizer.”

You can now become familiar with the contents of the Intel Fortran and related program folders and understand applicable post-installation tasks. Skip to Chapter 4 “Post-Installation Tasks.”

## **Performing a Custom Installation**

After you select a Custom installation and (if needed) reply to the Missing Prerequisite dialog box, a Custom Setup dialog box similar to the following one (shown for an IA-32 system) appears:



The Custom Setup dialog box lets you choose for each component whether:

- The entire component will be installed on a local disk
- The entire component will not be installed
- Some of the subcomponents of this component will be installed on a local disk (if it has subcomponents)

In the sample dialog box shown above:

- The prerequisite Microsoft\* Platform SDK was not installed, so the component Intel Fortran Compiler for Itanium-based Systems has a red X to the left of the component name and its subcomponents.
- The default for the Intel Fortran Compiler for 32-bit applications is to install all components on the local disk, so a disk drive is shown to the left of the component name and its subcomponents.
- 

To change whether the component is installed on the local disk or not installed, click the picture of the disk drive or red X to left of the component name. A pop-up menu lets you select whether:

- this component is installed on the local disk
- this component and its subcomponents are installed on the local disk

- this component is not installed on the local disk

The default location of the target installation disk device and top-level directory is:

- On IA-32 systems:  
C:\Program Files\Intel\Compiler70
- On Itanium-based systems:  
C:\Program Files (x86)\Intel\Compiler70

For the currently selected component, the currently selected disk/directory location appears to the left of the `Change...` button. To specify a different disk/directory location, click the `Change...` button to display the `Change Current Destination Folder`. You can use the `Change Current Destination Folder` to move up one directory level (icon in upper right), create a new directory (icon in upper right), specify a different disk device (list box under `Look in:`), and type in a directory name. Click the `OK` button when you have specified the desired disk and directory location.

The bottom of the `Custom Setup` dialog box contains the following buttons:

- `Help` displays an explanation of the disk or red X to the left of each component and subcomponent.
- `Disk Space` displays, for each disk letter, the disk space capacity, disk space available, and disk space required for the current selections.
- `<Back` displays the previous dialog box (if you want to select a `Typical` installation).
- `Next>` displays the next dialog box.
- `Cancel` lets you exit from the installation setup process.

After you have specified whether the components and subcomponents will be installed on the local disk and where components will be installed, click the `Next>` button.

The `Ready to Install Program` dialog box appears, allowing you to begin installing the selected components.

In reply to the `Ready to Install Program` dialog box, click the:

- `Install` button to begin installation
- `<Back` button to return to the previous dialog box
- `Cancel` button to exit the installation setup process

After you press the `Install` button, the installation copies the files to the target directories. Progress is shown in the `Installing Intel Fortran Compiler 7.0` dialog box. When complete, the `Installation Wizard Completed` dialog box appears:

- Choose whether or not you want to install Intel Array Visualizer after completing the Intel Fortran installation (IA-32 systems only)
- Click the `Finish` button to complete the installation of Intel Fortran
- If you requested installation of Intel Array Visualizer, skip to the section “Installing Intel Array Visualizer.”

If needed, you will be prompted to reboot your system.

To install Intel Array Visualizer, see the section “Installing Intel Array Visualizer.”

You can now become familiar with the contents of the Intel Fortran program folder and understand applicable post-installation tasks, as described in Chapter 4.

## Installing Intel Array Visualizer

Intel Array Visualizer can only be installed on IA-32 Windows systems (see Chapter 2). If you are installing Intel® Array Visualizer from CD-ROM, insert the Intel Fortran CD-ROM into a CD-ROM drive. If your Web browser does not automatically appear displaying the Intel Fortran installation page, double-click the file name *autorun.exe* in the root directory of the CD-ROM to display this page.

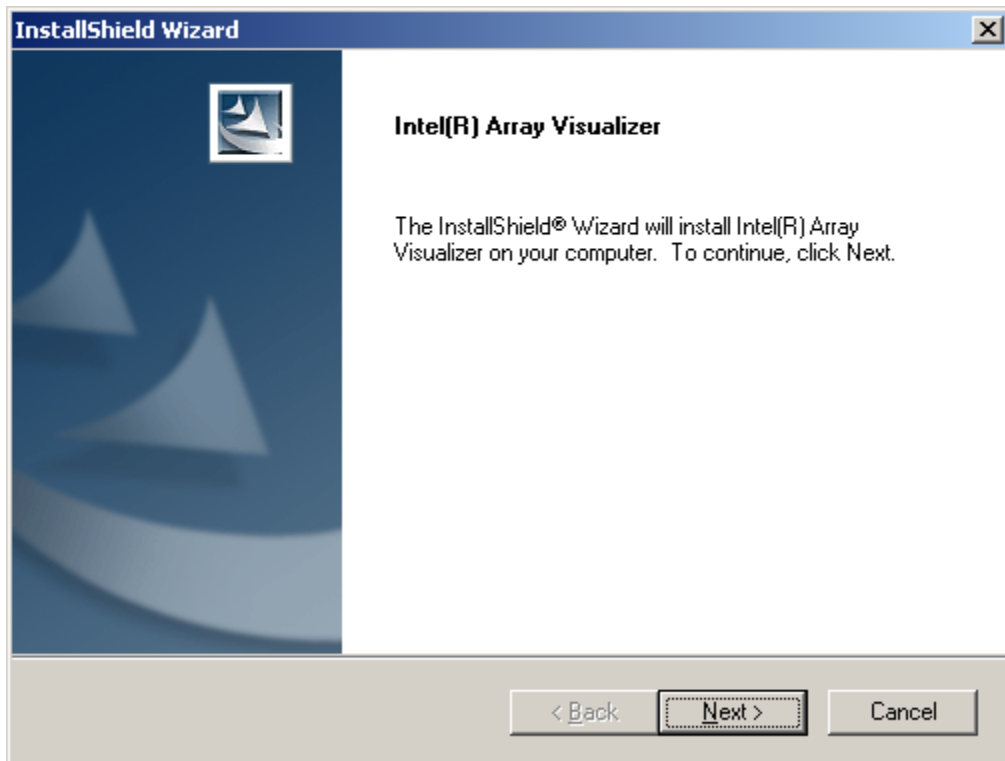
If you are installing a Web download of Intel Array Visualizer from a previously unpacked Intel Fortran intermediate directory, double-click the file name *index.htm* in the top-level directory selected previously as the intermediate directory to display this page (see the section “Starting the Installation from CD-ROM or Disk”).

This introductory Web page can be activated whenever needed, not only to install or reinstall Intel Fortran, but also for easy access to the helpful Web links displayed in the left margin.

If you chose to start installation of Intel Array Visualizer after completing installation of Intel Fortran, the installation starts automatically.

To start installation of Intel Array Visualizer at any time, click the link *Install Now* on the right side of the title Intel Array Visualizer. After a Preparing to Install dialog box briefly appears, the following dialog box appears:





Click the **Next>** button to continue.

**Note:** To exit from the Intel Array Visualizer installation setup process, click the **Cancel** button in the lower right of a dialog box.

If you previously installed Intel Array Visualizer, a dialog box will appear asking you whether you want to repair, modify, or remove Intel Array Visualizer.

If you want to install a newer version, you can choose to remove the previous version first. For example, you must remove beta test versions before installing later versions.

To modify or repair the same version of Intel Array Visualizer, you can select:

- Modify to change whether or not certain components are installed on disk.
- Repair if you are having problems with the current installation but do not want to change which components are installed on disk.

If this is a new installation of Intel Array Visualizer, after the Preparing to Install dialog box briefly appears, the License Agreement dialog box appears:

- Read the License Agreement. Use the scroll bar to display the entire text.
- If you agree with the terms of the License Agreement, click the line “I accept.”
- Click the **Next>** button to continue. Alternatively, you can click the **<Back** button to display the previous dialog box.

The Intel Array Visualizer dialog box lets you view the currently selected Destination Folder (installation disk device and directory path). The default location is:

`C:\Program Files\Intel\Array Visualizer`

To specify a different directory location, click the **Browse** button, which displays the Choose Folder dialog box. You can use the Choose Folder dialog box to specify a different disk device (under **Path** you can type in a directory name or under **Directories** you can select the appropriate device and directory). Click the **OK** button when you have specified the desired disk and directory location.

In reply to the Intel Array Visualizer dialog box:

- Click the **Next>** button to begin the installation of Intel Array Visualizer. This displays the Setup Status dialog box, which shows progress of the installation.
- Click the **<Back** button to return to the previous dialog box.
- Click the **Cancel** button to exit the installation setup process.

After installation completes, the InstallShield\* Wizard complete dialog box appears, allowing you to check for program updates. Do the following:

- Click the check box next to **Yes**, check for program updates or **No**, skip this step
- Click the **Finish** button to complete the installation of Intel Array Visualizer

If needed, you will be prompted to reboot your system.

You can now become familiar with the contents of the Intel Array Visualizer program folder and understand applicable post-installation tasks. Proceed to Chapter 4 “Post-Installation Tasks.”

## 4 Post-Installation Tasks

This chapter discusses certain tasks you need to perform after installation.

### Understanding the Intel® Fortran and Intel EDB Program Folders

The Intel® Fortran program folder is displayed when you click:

**Start > Programs > Intel® Software Development Tools > Intel® Fortran Compiler**

The contents of the Intel Fortran program folder depends upon the components selected during installation and might include:

Program Folder Item	Description
Intel Fortran for 32-bit applications (if installed)	Displays a command-line window for developing Intel Fortran applications for IA-32 systems from the command line.
Intel Fortran for Itanium®-based applications (if installed)	Displays a command-line window for developing Intel Fortran applications for Itanium-based systems from the command line.
Modify or Remove Intel® Fortran and EDB 7.0	Lets you modify, reinstall, or remove Intel Fortran and EDB (see “Changing Installation Options, Reinstalling, or Removing Intel Fortran” later in this chapter).
Intel® Fortran Compiler document index	Provides an HTML file with links to the Intel Fortran and related documentation (see Chapter 6).
Update User’s Registry (if needed)	To use an account other than the account used to install Intel Fortran on a system where Microsoft C++ 6 or Compaq* Visual Fortran 6.6 is installed: <ol style="list-style-type: none"><li>1. Log into that account; the account should be a member of the power user group (on Windows* 2000 and Windows XP operating systems)</li><li>2. Click this item to allow your account to use Intel Fortran</li></ol>

If you installed the Intel Enhanced Debugger (EDB), you can open the Intel EDB program folder when you click:

**Start > Programs > Intel® Software Development Tools > Enhanced Debugger**

The Intel EDB debugger program folder includes:

- The Enhanced Debugger tool
- Getting Started Debugging Itanium-based Applications notes

## **Copy Files Needed to Run Itanium-based Applications Created on an IA-32 System**

If you are only developing IA-32 applications or if you installed the Itanium-based Fortran compiler on your Itanium-based system and intend to use the Itanium-based system to develop applications, skip this step.

If you did not install the Itanium-based Fortran compiler on your Itanium-based system and need to use an IA-32 system with the Intel Fortran Itanium-based compiler to produce Itanium-based applications, perform the following steps from an account with sufficient file access privileges. This procedure copies certain required DLLs for Itanium-based systems from your IA-32 development system to the Itanium-based system, which sets up the environment so you can run Intel Fortran Itanium-based applications on the Itanium system:

1. Display a DOS prompt command-line window on your Itanium-based system.
2. Cross-mount the IA-32 system partition where you installed the 7.0 compiler. For example, use the k drive letter, replace *system-name* with your IA-32 system's actual name, and use an account with Administrator privilege:  
`prompt> net use k: \\system-name\C$ /user:administrator`
3. Change your default drive letter by typing the drive letter in the previous command:

```
prompt> k:
```

4. Change your default directory to the `ia64\bin` directory of the 7.0 compiler:  
`prompt> cd \"Program Files\"\\Intel\\compiler70\\ia64\\bin`
5. Execute the `dll_copy.bat` script file:

```
prompt> dll_copy.bat
```

If you have already installed the Itanium-based compiler on the Itanium-based system, omit the above steps because the setup program copies the necessary DLLs by default.

Note: The DLL's in the Platform SDK directory "Microsoft Platform SDK\\redist\\PreRelease\\win64" may also be required at runtime, and should be copied into the same directory as the executable on the Itanium-based system, so they take precedence over any versions distributed with the operating system. Some of these DLL files are not distributed with the operating system and are only available from the Platform SDK.

## When to Apply the Update User's Registry Option

The user account from which Intel Fortran was installed can use Intel Fortran after installation without any additional actions.

On systems where the Microsoft Visual C++ 6 development environment is installed that allow multiple users, you need to perform the following steps to enable each account to use Intel Fortran other than the account used to install Intel Fortran:

1. Log into the appropriate account, which must be a member of the power group on Windows 2000 and Windows XP systems.
2. Click the Update User's Registry item in the Intel Fortran program folder to enable this account to use Intel Fortran. This only needs to be done once after installation.

## Changing Installation Options, Reinstalling, or Removing Intel Fortran

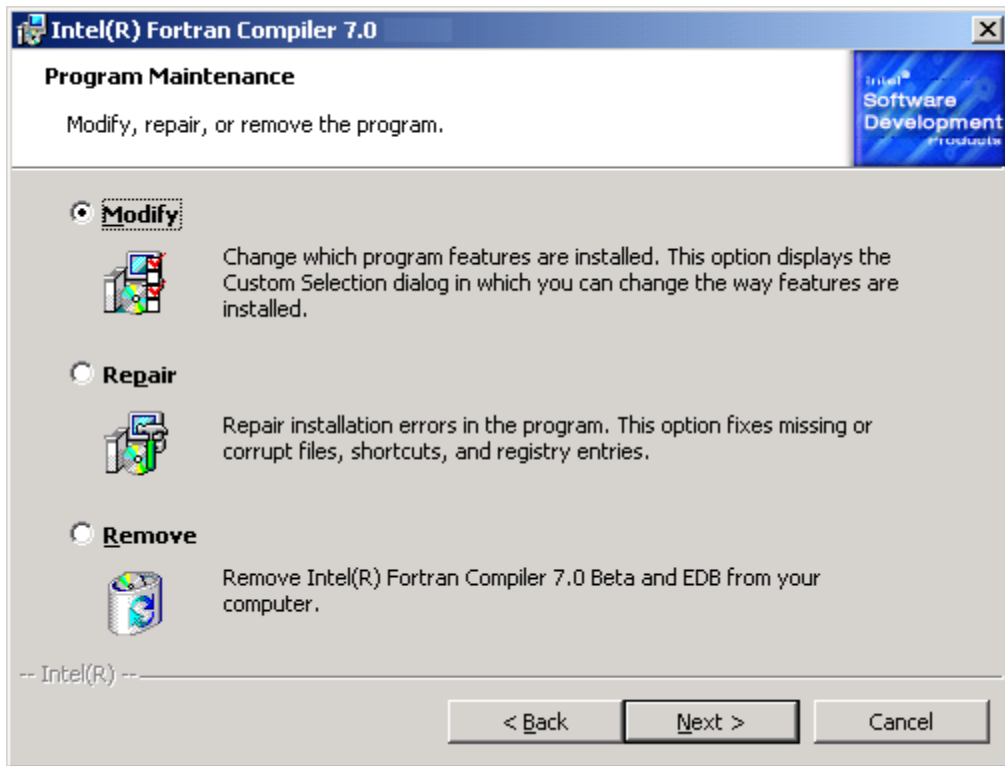
To remove Intel Fortran:

- Display the Control panel (**Start > Settings > Control panel**):
- Select Add/Remove Programs
- Scroll to and click Intel Fortran Compiler 7.0
- Click the Remove button
- Verify that you want to remove Intel Fortran and follow the displayed instructions
- Also see the section "Checking for and Removing Old Environment Variable Definitions" later in this chapter

To modify installation options or to reinstall Intel Fortran, obtain the Program Maintenance dialog box by doing the following:

- From the Intel Fortran program folder:
  - Select Modify or Remove Intel® Fortran and EDB 7.0
- From the Control panel (**Start > Settings > Control panel**):
  - Select Add/Remove Programs
  - Scroll to and click Intel Fortran Compiler 7.0
  - Click the Change button

The Welcome to the InstallShield\* Wizard for Intel Fortran 7.0 dialog box appears. Click the Next> button to display the following dialog box:



Do one of the following:

- To change the components selected for the previous installation of the same version, select **Modify**. This displays the Custom Setup installation dialog box described in Chapter 3, “Performing a Custom Installation.”
- To repair the existing installation without changing installation options of the same version, select **Repair**. The Ready to Repair Installation dialog box appears. Click the **Install** button to reinstall the same components previously installed.
- To remove Intel Fortran and the Intel EDB debugger (for example, before installing a newer version), select **Remove**. The Remove All Components dialog box appears. Click the **Remove** button to remove Intel Fortran and Intel EDB. The removal setup program will not remove your license files. You can manually remove the license files if needed.

## Understanding the Intel Array Visualizer Program Folder

To display the contents of the Intel Array Visualizer program folder, click:

**Start > Programs > Intel® Software Development Tools > Intel Array Visualizer**

The contents of the Intel Array Visualizer program folder includes:

Program Folder Item	Description
Intel® Array Viewer	Displays the interactive Intel Array Viewer, that lets you display previously saved data files (see “Using the Intel Array Visualizer” in Chapter 5).
Documentation	Displays an HTML page that lets you select the Intel Array Visualizer online documentation (see Chapter 6).

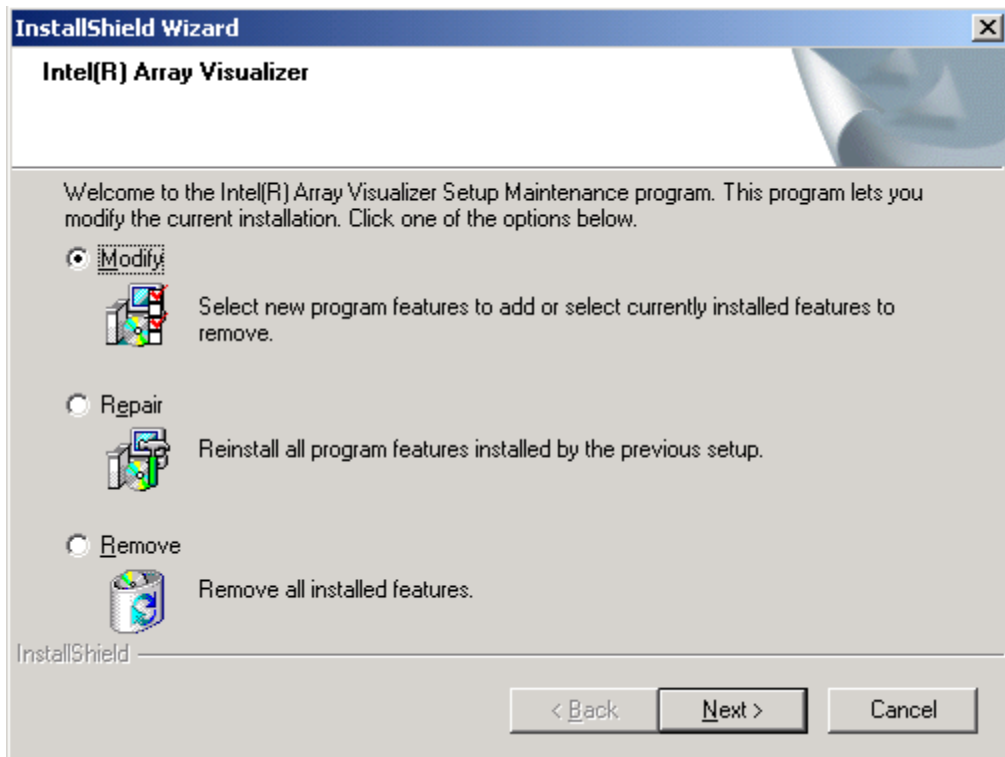
Note: Certain tasks must be performed before you can develop applications that use Intel Array Visualizer, as described in the Intel Array Visualizer online documentation or release notes. These tasks include adding appropriate directories to the PATH, LIB, and INCLUDE environment variables.

## Changing Installation Options, Reinstalling, or Removing Intel Array Visualizer

To obtain the dialog box needed to modify installation options, reinstall, or remove Intel Array Visualizer, do the following:

- From the Control panel (**Start > Settings > Control panel**):
  - Select Add/Remove Programs
  - Scroll to and click Intel Array Visualizer
  - Click the Change button

In reply to the Welcome dialog box, click the *Next>* button to display the following dialog box:



Do one of the following:

- To change the components selected for the previous installation of the same version, select **Modify**:
  1. The **Preparing to Install** dialog box appears briefly.
  2. The **Select Features** dialog box appears. Click the **Next >** button to begin installation.
  3. Upon completion, the **Maintenance Complete** dialog box appears. Click the **Finish** button to complete the installation.
- To repair the existing installation without changing installation options of the same version, select **Repair**:
  1. The **Setup Status** dialog box appears, showing progress of the installation.
  2. Upon completion, the **Maintenance Complete** dialog box appears. Click the **Finish** button to complete the installation.
- To remove Intel Array Visualizer (for example, before installing a newer version), select **Remove**:
  1. The **Confirm File Deletion** dialog box appears. Click the **OK** button to begin removing Intel Array Visualizer.
  2. The **Setup Status** dialog box appears, showing progress of the removal of Intel Array Visualizer.
  3. Upon completion, the **Maintenance Complete** dialog box appears. Click the **Finish** button to complete the removal of Intel Array Visualizer.



## Removing the Intermediate Download Directory

If you used the Web download kit, you needed to unpack it into an intermediate directory (see Chapter 3, “Web Installation: Unpacking the Download File”). You can keep the contents of the intermediate directory or the download kit file, but you do not need to keep both. In most cases, you can delete the contents of the intermediate directory. One exception is if you might change your options chosen during installation.

## Registering Your Purchase and Obtain Service Update Kits

If you purchased an Intel Fortran CD-ROM kit, you need to register your purchase and obtain and activate a new license. This enables you to receive technical support (see Chapter 7), including service updates.

If you purchased an Intel Fortran Web download kit, you have already registered your Intel Fortran purchase and do not need to obtain and activate a new license. You also automatically are registered to receive technical support (see Chapter 7).

To determine whether any service update kits are available, log into your Intel Premier technical support account (see Chapter 7).

## Copying Compaq\* Visual Fortran Project Files

Before you use Intel Fortran in the Microsoft\* Visual Studio.Net\* development environment, make back up copies of any Compaq\* Visual Fortran 6 project directories. Do **not** open project workspaces (such as .DSW files) for applications created with Compaq Visual Fortran 6 within the Microsoft Visual Studio.Net development environment. Opening project workspaces in the Microsoft Visual Studio.Net development environment results in an attempt to convert the project workspace into the Microsoft Visual C++.Net format, which is not supported by Intel Fortran 7.

## Redistributing Intel Fortran and Intel Array Visualizer Files

For information on redistributing your applications, see the file *Fredist.txt* in the top-level installation directory.

## Increasing the Stack Size for Programs That Use Large Data Arrays

Certain programs use large amounts of data. In particular, with those programs that use large allocatable arrays (dynamically allocated at run time) or use OpenMP\* or related parallel processing, certain tasks must be performed to provide enough stack space for the program to run.

Many kinds of variables and expressions can be allocated on the stack. If you are using array intrinsics or expressions, these can use large amounts of stack-allocated temporary storage (temporaries), even if the original variable is static or dynamically allocated.

The default stack size is about 1 MB. You can increase this by specifying the linker option `/stack:nnnnn`, where *n* is the number of bytes (in decimal) you want for the stack. This linker option can be specified on the command line.

To change the stack size of an already-linked executable, use the EDITBIN command, `/stack:nnnnn` option.

## Checking for and Removing Old Environment Variable Definitions

Intel Fortran modifies certain system-wide environment variables. You may need to remove the system-wide environment variables after you remove Intel Fortran.

On Windows 2000, Windows NT 4, or Windows XP systems:

1. Log into an account with Administrator privilege.
2. Open the Control panel (**Start > Settings > Control panel**).
3. Click System.
4. On Windows 2000 and Windows XP systems: Click the Advanced tab and then click the Environment Variables button.
5. On Windows NT 4 systems: Click the Environment tab.
6. View the displayed environment variables.
7. To have the environment variable changes take effect immediately, click Apply.
8. Click OK (to allow changes to be made) or Cancel (to not allow changes to be made).

For example, in the System Variables tab, check the definitions of the Path variable, which is used by Intel Fortran and other products:

- Double-click the Path variable.
  - Near the bottom of the window, the variable Path and its full definition appear.
  - Check the device and directory definitions of the PATH variable. If an older directory path exists, remove it. Directory path names are delimited by semicolons (;) and the last path name might contain `%SystemRoot%`.
  - Check the INCLUDE and LIB variables (used by Intel Fortran and other program development products).
9. Check for the environment variable `INTEL_LICENSE_FILE`. If no other Intel software products are installed, this variable does not need to be defined.

On Windows Millennium Edition systems:

1. Click the **Start** menu, then click **Run**.
2. Type MSCONFIG and click OK. The System Configuration utility window appears.
3. Click the Environment tab.
4. Follow the instructions above starting at Step 7

On Windows 98 systems:

1. Make a backup copy of your AUTOEXEC.BAT file
2. Carefully edit the AUTOEXEC.BAT file in the root directory of your system disk.
3. Carefully remove each set of old lines for previous versions of Intel Fortran from this file.
4. Save the AUTOEXEC.BAT file before you exit the editor.

On systems where the Microsoft Visual C++ 6 development environment is installed, within the Microsoft Visual C++ 6 development environment (see Chapter 5), you can check for old definitions of the PATH, LIB, and INCLUDE environment variables by using the **Tools > Options > Directories tab**.

## 5 Using Intel® Fortran

### Overview

On IA-32 systems, you can use Intel® Fortran from the command line or from the Microsoft\* development environment. The Microsoft development environment and the features you use to develop Intel Fortran applications differ between the Microsoft\* Visual C++\* 6 development environment and Microsoft\* Visual Studio.Net\* development environment.

On Itanium®-based systems, use the command line.

### Using the Command Line

To create applications from the command line for IA-32 systems:

- Use the Intel Fortran command prompt, which has the appropriate environment variables already set for the command-line environment. In the Intel Fortran program folder, select:  
`Intel Fortran for 32-bit applications`
- Use the `ifl` command, either directly on a command line or in a makefile, to invoke the Intel Fortran compiler to create 32-bit applications for IA-32 systems.
- Refer to the *Intel Fortran Compiler User's Guide* for information on compiler options, customizing the compilation environment, using the `nmake` command to process makefiles, using optimizations for optimal run-time performance, and other compiler features.

To create applications from the command line for Itanium-based systems:

- Use the Intel Fortran command prompt, which has the appropriate environment variables already set for the command-line environment. In the Intel Fortran program folder, select:  
`Intel Fortran for Itanium®-based applications`
- Use the `efl` command, either directly on a command line or in a makefile, to invoke the Intel Fortran compiler to create applications for Itanium-based systems.
- Refer to the *Intel Fortran Compiler User's Guide* for information on compiler options, customizing the compilation environment, using the `nmake` command to process makefiles, using optimizations for optimal run-time performance, and other compiler features.

For example, assume you have used a text editor (such as Notepad) to create a small program that displays the text `Hello World!` on the screen. To compile and link the source file `hello.f90` for debugging on an Itanium-based system, type:

```
prompt> efl /Zi /Od hello.f90
```

This creates the file `hello.exe` with symbol table debug information as well as `hello.obj`. If you are using an IA-32 system to create Itanium-based applications, copy the file `hello.exe` to the Itanium-based system before running the file. To run this file, type `hello.exe`:

```
prompt> hello.exe  
Hello World!
```

To compile a source file for higher optimization, omit the `/Zi` and `/Od` options and use the appropriate optimization options. For example, to compile `calculate.f90` for an Itanium-based system, type:

```
prompt> efl /O3 calculate.f90
```

If your application source code contains commonly-used extensions to the Fortran 95 standard (such as `TYPE` or `PRINT` statements), you can suppress source diagnostic warning messages for Fortran 95 extensions by specifying the `/w95` option. For example, to compile and link the source file `hello.f90` for debugging without standard diagnostic messages on an IA-32 system, type:

```
prompt> ifl /Zi /Od /w95 hello.f90
```

Refer to the *Intel Fortran Compiler User's Guide* for information on compiler options, customizing the compilation environment, using the `nmake` command to process makefiles, using optimizations for optimal run-time performance, compatibility with Compaq\* Visual Fortran, and other compiler features. For more information on Intel Fortran documentation, see Chapter 6.

The Intel Fortran Compiler 7.0 can coexist on the same system with Compaq Visual Fortran 6.x product or Intel Fortran Compiler 6.0. If you use the command line tools from any of these products, please make sure that the `PATH`, `LIB`, and `INCLUDE` environment variables are set up correctly for the product you are using (you can apply the appropriate `*vars.bat` file). To use Compaq Visual Fortran from the command line, you can select "Fortran command prompt" from the Compaq Visual Fortran program folder. To use Intel Fortran from the command line, you can similarly select the appropriate Intel Fortran compiler from the Intel Fortran program folder.

## **Using the Microsoft\* Visual Studio.Net\* Development Environment**

You can use Intel Fortran within the Microsoft\* Visual Studio.Net\* development environment to develop Fortran applications, including static library (`.LIB`), dynamic link library (`.DLL`), and main executable (`.EXE`) applications.

When using the Microsoft Visual Studio.Net (VS.Net) development environment, you can only build applications for IA-32 Windows\* systems.

## Mixed-Language Programming and Intel Fortran Project Types

This version of Intel Fortran produces only unmanaged code, which is architecture-specific code. You cannot create an Intel Fortran main program that directly calls a subprogram implementing managed code. To call managed code, you can call an unmanaged code subprogram in a different language that does support calling managed code.

When using the Microsoft VS.Net development environment, Intel Fortran supports the following project types:

- Console applications: the Intel Fortran main program supports character cell output in a terminal-like window.
- QuickWin applications: the Fortran main program supports certain graphical output.
- Static library applications: the .LIB file is used as a subprogram to another main program.
- Dynamic link library applications: the .DLL file (and its import library) is used as a subprogram to another main program.

For more information about Intel Fortran project types, see “Understanding Intel Fortran Project Types.”

An Intel Fortran program can be the main program and call Intel Fortran subprograms, including Intel Fortran static and Intel Fortran dynamic link libraries. Similarly, Intel Fortran can be called by Intel C++ main programs and can call Intel C++ subprograms, if the appropriate calling conventions are used (see the *Intel Fortran Compiler User's Guide*).

For mixed-language applications, an Intel Fortran main program can call a subprogram written in Intel C++, Microsoft Visual C++, or Microsoft Visual C++.Net. However, an Intel Fortran main program cannot call Microsoft Visual Basic or Microsoft Visual Basic.Net\* subprograms.

You can use Intel Fortran dynamic link libraries as subprograms in mixed-language applications, if the main program is written in Intel Fortran, Intel C++, Microsoft Visual C++, or Microsoft Visual Basic (or similar).

You can use Intel Fortran static libraries as subprograms if the main program is written in Intel Fortran, Intel C++, Microsoft Visual C++ (or similar). However, Intel Fortran static libraries cannot be called as subprograms by Microsoft Visual Basic.Net\* or Microsoft C#.Net\*.

## Understanding Solutions and Projects

The Microsoft Visual Studio.Net\* development environment consists of one or more projects contained within a *solution*. For example, if you have several Fortran applications that do different calculations but are related to the same research application you are working on, you can store all the individual projects in a single solution.

If you are familiar with Microsoft Visual C++ 6 or with Compaq Visual Fortran, instead of opening a *project workspace file* (.dsw or .dsp) to access an existing project(s), you open a *solution file* (.sln) in the Microsoft VS.Net development environment.

Caution: Before you use Intel Fortran in the Microsoft VS.Net development environment, make backup copies of any Compaq Visual Fortran 6 project directories. Do **not** open project workspaces (such as .DSW files) for applications created with Compaq Visual Fortran 6 within the Microsoft VS.Net development environment. Opening Compaq Visual Fortran 6 project workspaces in the Microsoft VS.Net development environment results in an attempt to convert the project workspace into the Microsoft Visual C++.Net\* format, which is not supported by Intel Fortran Version 7.

## How to Start and Exit the Microsoft\* Visual Studio.NET Environment

From the Microsoft\* Visual Studio.Net\* program folder, click Microsoft Visual Studio.NET:

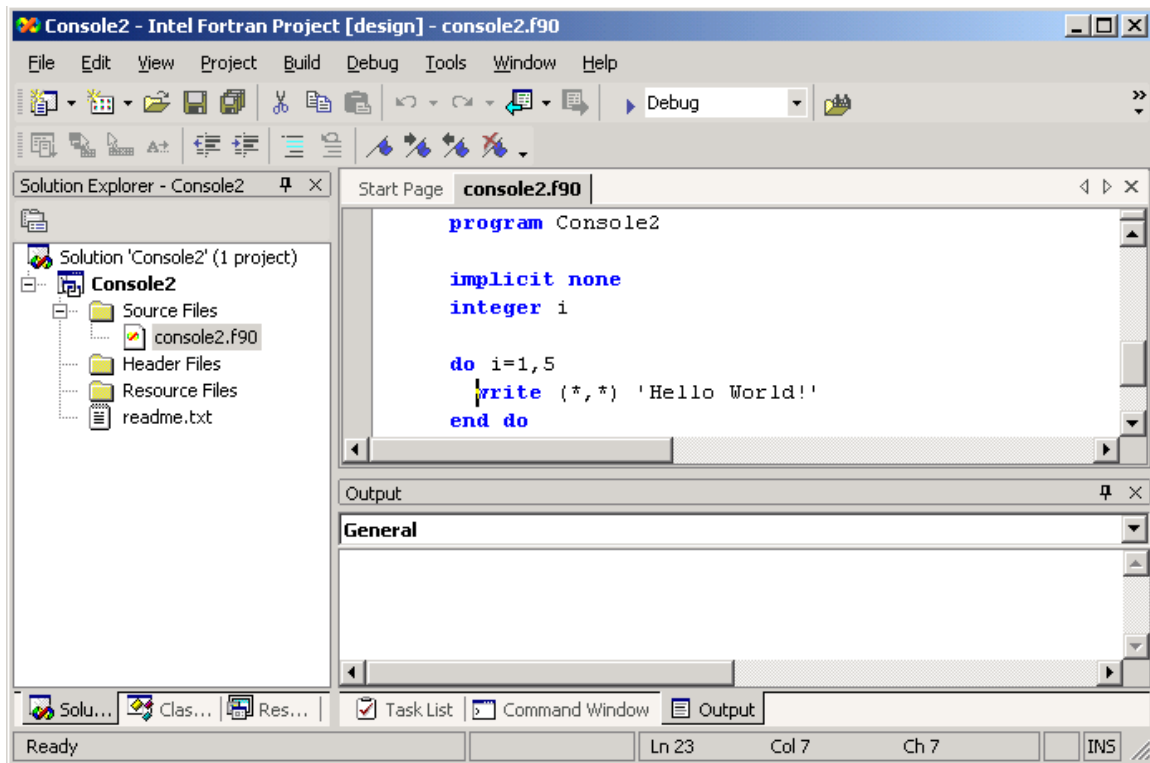
1. From the **Start** menu, click **Programs**, then **Microsoft Visual Studio.Net**
2. Click **Microsoft Visual Studio.Net**

The Microsoft development environment window appears.

To exit, close all open solutions and files, then click **Exit** from the **File** menu.

## Visual Development Environment Windows

After you start the Microsoft Visual Studio.NET environment, a window similar to the following appears:



This screen shows that the Solution named Console2, the Project named Console2, and the source file Console2.f90 have been opened. The right pane shows the file Console2.f90 opened in the default language-sensitive visual development environment text editor, which uses different colors to identify the following:

- Source comments (green)
- Fortran standard language elements (blue)
- Other language text (black)

The left pane shows the Solution Explorer window, which lets you view different aspects of your solution, such as the source files in your solution. The tabs displayed in the Solution Explorer window vary depending upon the products installed and the files associated with the current solution. The sample screen shown above shows a Solution tab, a ClassView tab (not used by Intel Fortran), and a Resource tab. To display the Solution Explorer window, in the **View** menu, click **Solution Explorer (View > Solution Explorer)**.

To edit a file listed in the Solution pane, either double-click its file name or click **File > Open**.

The bottom of the right pane shown above also shows the output window, where compilation and linker messages are displayed. The tabs displayed in the output window vary depending upon attributes associated with the current Solution and the windows you have elected to display. This bottom-right pane also has tabs for a Task list, and a



Command Window. The Output window displays build output, such as compiler and linker messages. To display the Output window, click: **View > Other Windows > Output**.

The appearance of windows in the visual development environment also depends upon the preferences that may have been chosen from the “My Profile” option on the start page. To display the start page, click **Help > Show Start Page**. Click the My Profile link in the left pane. In most cases, specifying the profile of a Visual C++\* developer is preferred for Intel Fortran users.

## Understanding Intel Fortran Project Types

Development is organized into *projects* consisting of the source files required to build an application. To set up a project, you need to define the project and set options for it. Then, using the source files, you can build the binary executable or library file. The output of building the application becomes part of the project. A project is stored in a project folder on your hard drive.

Intel Fortran projects can be a main program, or they can be a subprogram in the form of a static or dynamic link library.

If the Intel Fortran project is a main program, it must be one of the following *project types*:

- Console application. When you run a Fortran Console application, it displays a single character-cell terminal window. The programming complexity for a Console application is simple, since the output resembles character-cell applications (no graphics).
- QuickWin application. When you run a Fortran QuickWin application, it displays as multiple windows with graphics such as menus, charts, and icons. Programming complexity ranges from simple to moderate, depending on the graphics and user interaction used.

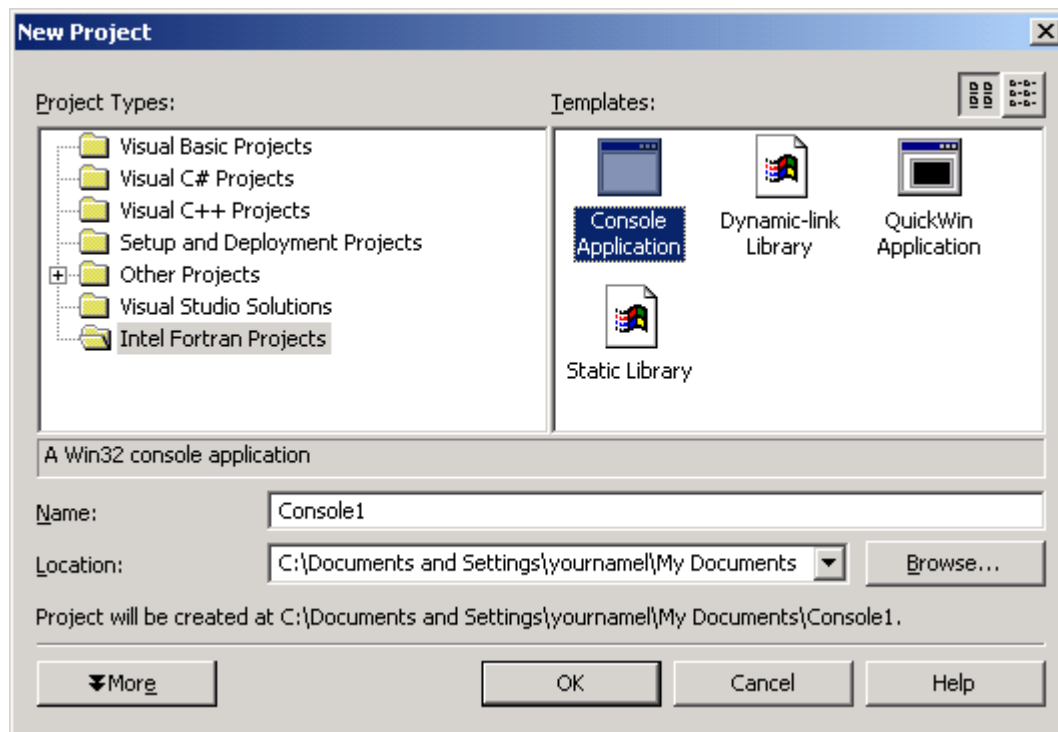
If your Intel Fortran project is a subprogram that is linked into a main program written in Intel Fortran, Intel C++, or one of the other supported VS.Net languages, it must be one of the following project types:

- Static Library application. A *static library* (file extension .LIB) is a set of routines that are loaded into your application at link time.
- Dynamic-Link Library (DLL) application. A DLL (file extension .DLL) is a set of routines that are loaded into your application at run time.

You need to create a separate project for each binary executable or library file to be created. A single solution can contain multiple projects, such as an Intel Fortran Console main program and an Intel Fortran Static library.

## How to Create a New Project

You can create a new Intel Fortran project by choosing one of the four project types. To create a new project, click **File > New > Project**. A window resembling the following appears:



To create an Intel Fortran project, do the following:

1. Click Intel Fortran Projects in the left pane (as shown above) to display the Intel Fortran project types.
2. Click the appropriate project type (see preceding text).
3. Accept or specify a project name (shown above as Console1).
4. Accept or specify the Location for the project directory.
5. Verify that the selections made are correct and click the OK button.

An AppWizard window appears for the selected project type. For Console and Dynamic Link Library projects, the AppWizard window lets you select options for creating the project. For example, when you create a Console project, click Application Settings in the left margin to display the AppWizard options.

Once you click the OK button, the project and its files appear in the Solution Explorer window. A few typical tasks you can perform include:

- Close a solution: **File > Close Solution**
- Open a solution, use one of:
  - **File > Recent Projects > *solution-name***
  - **File > Open Solution**

- Open a file in the text editor, use one of:
  - Double-click the file name in Solution Explorer
  - Click **File > Open > File** (for files not in a project)
- Create a new file and add it to the project: **Project > Add New Item**
- Add an existing file to the project: **Project > Add Existing Item**
- Build the entire solution: **Build > Build Solution**
- Build the project: **Build > *project-name***
- Rebuild the entire solution: **Build > Rebuild Solution**
- Rebuild the project: **Build > Rebuild *project-name***

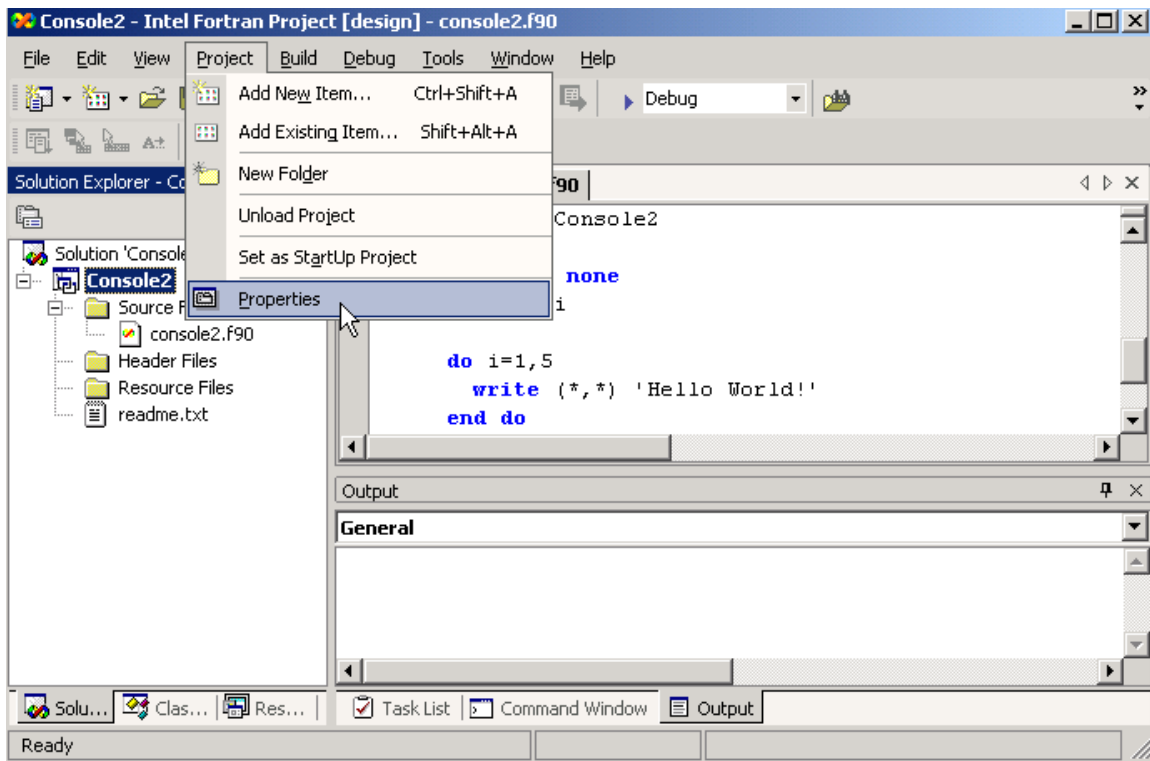
Other tasks include:

- Change the current Configuration: **Build > Configuration Manager**
- Insert a debugger breakpoint: Either click in the left margin of the text editor window or use the Breakpoints tab
- Display or hide the Breakpoints tab: **Debug > Windows > Breakpoints**
- Start the debugger: **Debug > Start**
- Stop the debugger: **Debug > Stop Debugging**

## How to Set Compiler Options

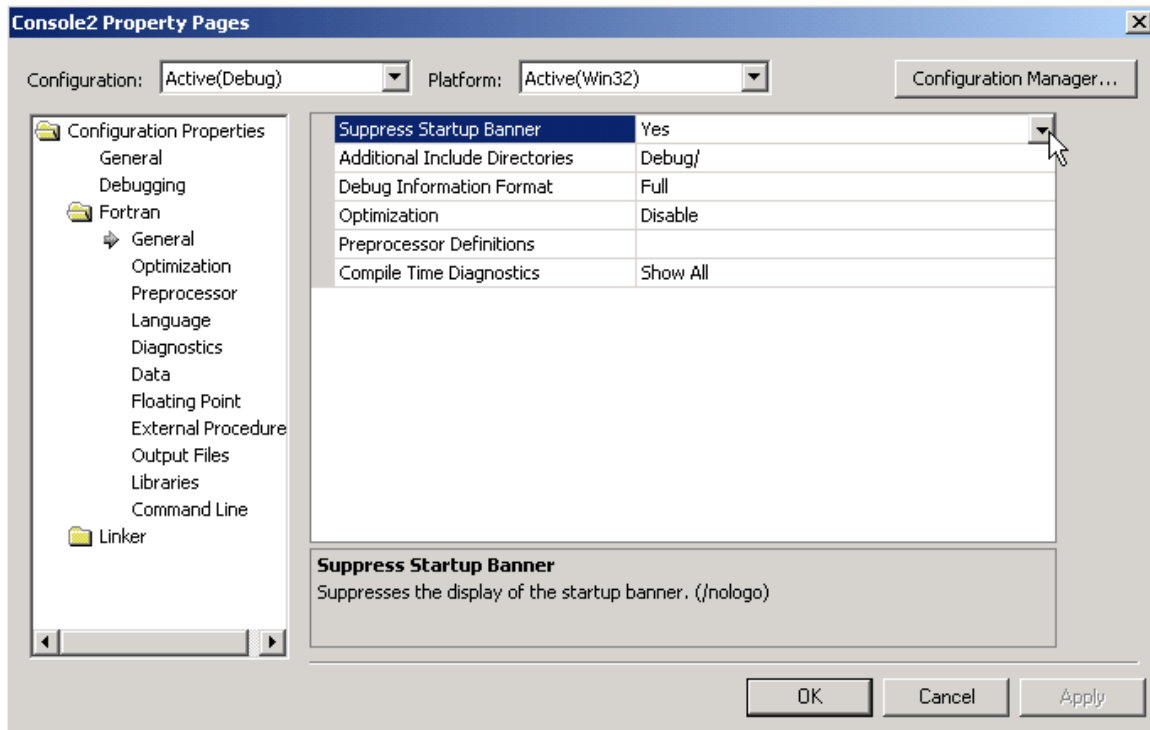
You can set the compilation and related options for the current project by doing the following:

- Select the project name in the Solution Explorer (the project name Console2 in the sample screen below).
- In the **Project** menu, click **Properties**, as shown in the sample window below (or right-click the project name and select Properties):



Intel Fortran also lets you specify compiler options for individual source files. Select the file name and click **View > Property Pages**.

To display the Fortran compiler option categories, click the Fortran folder in the left pane. The following sample screen shows the compiler options in the General category in the right pane. The selected option within the General category is Suppress Startup Banner (default is Yes). Help for this option appears in the bottom of the pane, including the command-line name of the compiler option, which in this case is /nologo.



To change the setting for a compiler option, click the option's line to display a button near the end (right) of the line. For example, in the sample window above, the pointer is positioned near the down arrow for a drop-down list for the Suppress Startup Banner option. Click the button at the right of an option line (as shown above) to display the available selections or display a dialog box.

The category Command Line (left pane) lets you type in an option as you would from the command line. The Command Line category lets you type in certain Intel Fortran compiler options that are not represented in the General, Optimization, Preprocessor, Language, Diagnostics, Data, Floating Point, External procedure, Output Files, or Libraries categories.

To change the configuration (such as from Debug to Release), click the Configuration Manager button in the upper-right of this window.

Some of the Intel Fortran compiler options appear in multiple categories. Options not listed in one of the categories can be typed into the Command Line category window. For a description of these options, see the *Intel Fortran Compiler User's Guide*.

In the Diagnostics category, to allow selection of individual suboptions, you can specify the Compile Time Diagnostics or Runtime Error Checking item as Custom.

## Using Debuggers

When debugging applications created for IA-32 systems, the debugger you use depends upon the version of Microsoft\* Visual Studio\* you have installed:

- To debug applications created for IA-32 Windows\* systems that have Microsoft\* Visual C++\* 6 development environment installed, use the Intel Enhanced Debugger (EDB).
- To debug applications created for IA-32 Windows\* systems that have Microsoft\* Visual Studio.Net\* installed, use the Microsoft\* Studio.Net\* debugger.

To debug applications created for Itanium-based systems, use the Intel Enhanced Debugger (EDB).

The program should be compiled with the /Zi and /Od options or by selecting a Debug configuration in the visual development environment. The /Od option disables most optimizations, which often makes debugging easier. For cases where the problem does not occur or cannot be isolated with the /Od option, specify the /Zi option with a higher optimization level (such as /O1 or /O2) instead of /Od.

## Using the Microsoft\* Visual Studio.Net\* Debugger

To debug applications created for IA-32 Windows\* systems, you can use either the Intel Enhanced Debugger (EDB) or, if the application was created using the Microsoft\* VS.Net\* development environment, you can use the Microsoft\* Visual Studio.Net\* debugger.

Before you debug an application, open its Solution from the **File** menu (**File > Open Solution**).

Build the project by clicking **Build** or **Rebuild** from the **Build** menu. If compilation or linker diagnostic messages appear in the Output window indicating source-related errors, fix the cause of the problem and rebuild the application, until it builds successfully. To go to the source code associated with a diagnostic message in the Output window, double-click the line associated with the message in the Output window (or click the line with the message and press the F4 key).

To set breakpoints and control program execution:

- To set a breakpoint, click in the left margin next to the source where you want to set or remove a breakpoint. A filled-in red circle appears.
- To start the debugger, click **Start** in the **Debug** menu. The program executes and stops at the first breakpoint.

- You can Step Over the current statement (**Step Over** item in the **Debug** menu, or click the Step Over button on the Debug toolbar).
- You can Step Into a routine or Step Out of a routine using the **Debug** menu or the Debug toolbar.

To control the appearance of the debugger-related panes, in the **Debug** menu, click **Windows** and select the appropriate window, such as **Breakpoints**. For example, the Breakpoints window (appears as a tab near the Output window) allows you to disable or enable a breakpoint.

To restart execution of the application being debugged, click **Restart** in the **Debug** menu.

To stop debugging, click **Stop Debugging** in the **Debug** menu.

For more information about using the Visual Studio.Net\* debugger, see the Microsoft MSDN\* online help.

## Using the Intel EDB Debugger

To start the Intel EDB debugger and load a program for debugging:

1. In the Intel® Software Development Tools program folder, click **Enhanced Debugger 7.0** and click **Enhanced Debugger**
2. In the **File** menu, click **Load** (or click the Load button in the Standard toolbar).
3. Specify the executable program to be debugged. Your source program appears in the left pane.

You can change the appearance of the windows displayed:

- To change the displayed toolbars, click **Toolbars** in the **View** menu
- To view the local variables, click **Locals** in the **View** menu
- To display other windows, use the **View** menu

You can set or remove breakpoints and control program execution:

- To step through your program, click the Step Over button in the Execution toolbar or the **Step Over** item in the **Execute** menu. You can also choose to **Step Into** a routine, or **Step Out** of a called routine. The available shortcut keys are:
  - Press F10 for **Step Over**
  - Press F11 for **Step Into**
- To insert a breakpoint, click on a source line and then clicking the Insert/Remove Breakpoint button (red filled-in circle) on the Execution toolbar. When a breakpoint is set, a filled-in red circle appears to the left of the source line. To remove a breakpoint, select the line containing the breakpoint and click the Insert/Remove Breakpoint button so the red circle to the left of the source line becomes hollow. The shortcut keys and relevant right-click pop-up menus items are:
  - Press F9 to **Set Breakpoint** or **Unset Breakpoint**

- Right click on the appropriate statement line and select **Remove Breakpoint** or **Insert Breakpoint** from the pop-up menu
- To let the program execute until the next breakpoint is reached, click the Go (down arrow) button in the Execution toolbar, press F5, or click **Go** in the **Execute** menu.
- To let the program run to the cursor's position: use either the **Run to Cursor** button in the **Execute** menu or click **Go to Cursor** in the **Execute** menu. You can use the right-click pop-up menu to request **Go to Cursor**.
- To restart the loaded program, use either the **Restart** button in the **Execution** menu or click **Restart** in the **Execute** menu.

Please refer to the menu items and online help for the Intel EDB debugger for more information, including:

- The files `readme.txt` (select Getting Started Debugging Itanium-based Applications in the EDB program folder) and `edb_issues.txt` (in Program Files\Intel\EDB70\Docs\Notes)

To exit your program, either use the **End Process** item or **Exit** item in the **File** menu.

## Using the Microsoft\* Visual C++\* 6 Development Environment

Intel Fortran provides a Compiler Build Tool for use with the Microsoft\* Visual C++\* 6 development environment. The Microsoft Visual C++ 6 development environment is available if you install the appropriate edition of Microsoft Visual C++ 6 or Compaq Visual Fortran 6.6.

The Intel Fortran Compiler 7.0 can coexist on the same system with Compaq Visual Fortran 6.x product or Intel Fortran Compiler 6.0. When using the Microsoft Visual C++ 6 development environment, you can use either the Intel Fortran 7.0 compiler or the Compaq Visual Fortran compiler, but not both. If you choose to install and activate the Intel Fortran Compiler Build Tool in the Visual C++ 6 development environment, you can no longer use the Compaq Visual Fortran compiler in the Visual C++ 6 development environment. To prevent installation of the Compiler Build Tool on a system using the Visual C++ 6 development environment, select a Custom installation and deselect the Build Tool Files. If you encounter problems, check the environment variable settings for the INCLUDE, LIB, and PATH in the **Tools > Options > Directory** tab.

After you install Intel Fortran, you need to initialize the Build Tool once, as follows:

- Start the Developer Studio development environment from the Microsoft\* Visual C++ (or appropriate) program folder.
- Click **Customize** from the **Tools** menu. The Microsoft\* Developer Studio\* displays the **Customize** window.
- Select **Add-ins and Macro Files** tab.
- Click the check-box located to the left of the Intel Fortran Compiler Build Tool.



- Click the **Close** button to return to the Microsoft development environment.

This procedure enables use of the Fortran Compiler Build Tool. Please refer to the *Intel Fortran Compiler User's Guide* (see Chapter 6) for more information.

## Using the Intel® Array Visualizer

The Intel® Array Visualizer allows you to display and graph array data. Application programs can use the following methods to control the displayed graphs and data grid:

- Object model properties, methods, and events
- ActiveX\* controls
- Library API routines

The Intel Array Visualizer object model is a set of reusable objects that provide access to Intel Array Visualizer features and functionality. The COM interface supports an extensive object model that provides methods, properties, and events that can be accessed from any language that supports COM objects, including Microsoft Visual Basic, Microsoft Visual Basic.Net, Microsoft Visual C++, Microsoft Visual C++.Net, and Microsoft Visual C#.Net.

The Intel Array Visualizer ActiveX controls include:

- AvGrid displays the array data in a scrollable grid.
- AvGraph displays the array data in a graph.
- AvTree displays the hierarchical view of the elements of your project.

The library routines allow Fortran and C++ applications to access a subset of the extensive object model by using traditional library routine API interfaces that are easier to use than ActiveX controls or object model interfaces.

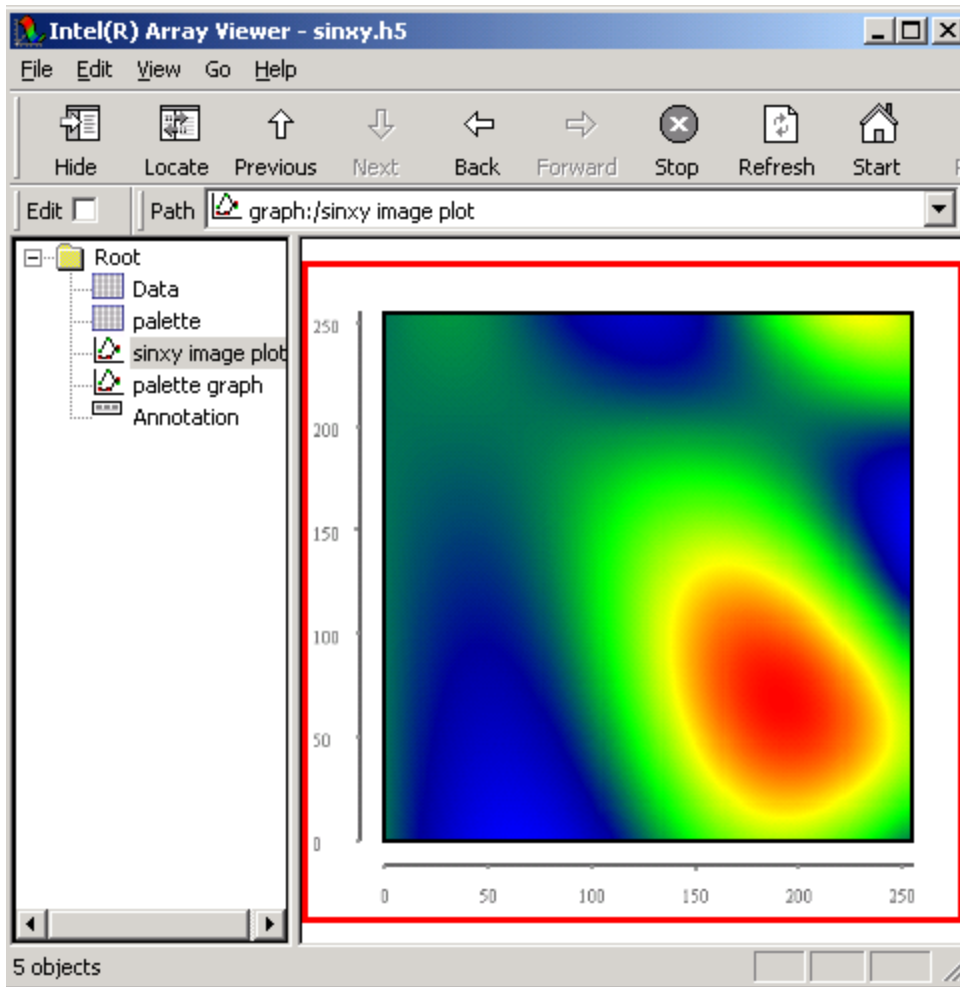
Applications can also save their array data in the form of a graphics file, which can be read later by the Intel® Array Viewer. When you install the Intel Array Visualizer, you also install its viewer, Intel Array Viewer.

The Intel Array Viewer lets you interactively display data grids as well as various types of graphical plots. Depending upon the data file selected, different attributes of the file will appear in the left pane.

If you accepted the default directory during installation, the sample graphics data files are installed in:

`C:\Program Files\Intel\Array Visualizer\Data`

The following figure shows the Intel Array Viewer displaying an image plot of one of the sample data files (file `sinxy.hdf`).



## Intel Fortran Language

Intel Fortran is fully compliant with the ISO/IEC 1539:1995 Fortran standard, usually referred to as "the Fortran 95 Standard" or as "Fortran 95." Intel Fortran also includes a number of extensions to the Fortran 95 Standard, as well as command-line options that allow you to override the default actions of the compiler.

The Intel Fortran compiler allows you to obtain outstanding performance from all Intel 32-bit processors, including the Intel Pentium® 4 and Intel Xeon™ processors, and the Intel Itanium® processors. Through the use of unique compiler optimizations, such as support for Streaming SIMD Extensions 2 (SSE2) in the Intel Pentium 4 processor and software pipelining in Intel Itanium processors, the Intel Fortran compiler can deliver strong performance improvements. Using features such as Interprocedural Optimization and Profile-Guided Optimization can further improve application performance. The Intel Fortran compiler is substantially source compatible with Compaq Visual Fortran.

For more information, refer to the Intel Fortran documentation (see Chapter 6).

## Interface Definitions for Library Routines

Intel Fortran provides interface definitions to certain external routines, including Intel Fortran library routines, Intel Array Visualizer library routines, and certain Win32 routines.

Please refer to the beginning of the appropriate chapter in the *Intel Fortran Libraries Reference* for interface blocks or USE or INCLUDE statements needed for certain groups of library routines. For example, to call certain Portability routines, add the statement line USE IFLPORT or add the corresponding INCLUDE statement (or just the specific interface block) for the file `iflport.f90` in the `...\INCLUDE` directory.

For information on calling Win32 routines (IA-32 systems only) using the Intel Fortran interface definitions, see the *Intel Fortran Compiler User's Guide*.

For information about calling the Intel Array Visualizer routines, refer to the Intel Array Visualizer online documentation.

## 6 Documentation Road Map

Intel® Fortran and Intel® Array Visualizer provide online documentation in multiple formats:

- Microsoft\* HTML Help CHM format
- Adobe\* Acrobat\* PDF format
- HTML or HTML-based files

### Accessing the Intel Fortran Documentation Index

To access the Intel Fortran documentation, open the Intel Fortran documentation index in the Intel Fortran program folder. To display the Intel Fortran program folder:

**Start > Programs > Intel® Software Development Tools > Intel® Fortran Compiler**

Alternatively, you can open the file `fcompindex.htm` (in the **File** menu, click **Open**, click the **Browse** or **Choose File** button). The `fcompindex.htm` file is located in the CD-ROM root directory and is installed in the Intel Fortran `...\Compiler70\Docs` directory.

### Intel Fortran Documentation in HTML Help Viewer Format

The *Intel® Fortran Compiler User's Guide* (for Windows Systems) describes the Intel Fortran compiler, including the `efl` and `ifl` commands, and the various compiler options for IA-32 and Itanium®-based systems. It contains sections that describe new features for this release, using the command line environment, customizing the compilation environment and process, mixed language programming with C++, understanding libraries, using compiler optimizations to gain maximum performance of your application, and understanding error messages.

The *Intel® Itanium® Assembler User's Guide* describes how to use the Intel Itanium Assembler on Itanium-based systems.

The *Intel® Itanium® Architecture Assembly Language Reference* describes the programming conventions used to write an Assembly program for the Itanium-based systems.

HTML Help files have multiple tabs, including a Contents, Index, and Search tab. Here are some tips related to using the Search tab:

- To locate multiple adjacent words, enclose the words within quotation marks.
- After typing the search string, click the `List Topics` tab to display a list of topics that match the search string.
- You can either double-click one of the topics listed to display its contents or select the topic and click the `Display` button.

## Intel Fortran Documentation in Available in PDF Format

The *Intel Fortran Programmer's Reference* describes the Intel Fortran programming language, including Intel Fortran language elements as well as Intel Fortran extensions to the Fortran 95 standard.

The *Intel Fortran Libraries Reference* describes the Intel Fortran intrinsic procedures and the portability, POSIX\*, and QuickWin library routines. It provides an alphabetic listing of the intrinsics and library routines within their respective categories.

The *Intel Fortran Installing and Getting Started* is the guide you are now reading.

*Using the Intel(R) License Manager for FLEXlm\** describes how to install and use the Intel(R) License Manager for FLEXlm\* to configure a license server for systems using counted licenses. This document is available from the Intel® License Manager for FLEXlm\* program folder.

To read these documents, you must have installed Adobe\* Acrobat\* Reader (or Adobe\* Acrobat\*) Version 4 or later.

## Intel Fortran Documentation in HTML Format

The *Enhancing Performance with Intel Compilers* provides an interactive HTML-based tutorial on using compiler options that help you optimize your application for IA-32 and Itanium-based systems. To view this tutorial, select the Intel® Compiler Tutorial from the Intel® Software Development Tools program folder (**Start > Programs > Intel® Software Development Tools**).

The *release notes* for Intel Fortran describe the latest information about the Intel Fortran compiler. To view the release notes, select Release notes from the Intel® Software Development Tools program folder.

## Accessing the Intel Array Visualizer Documentation Index

To access the Intel Array Visualizer documentation, open the Intel Array Visualizer documentation index in the Intel Array Visualizer program folder. To display the Intel Array Visualizer program folder, click:

**Start > Programs > Intel® Software Development Tools > Intel® Array Visualizer**

Alternatively, you can open the file `avindex.htm` file (in the **File** menu of a Web browser, click **Open**, then click the `Browse` or `Choose File` button). The `avindex.htm` file is located in the CD-ROM root and is installed in the `...\Array Visualizer\Docs` directory.

## Intel Array Visualizer Documentation in HTML Help Viewer Format

Intel Array Visualizer documentation in online HTML Help format includes the Intel Array Visualizer online reference documentation and the Intel Array Viewer online documentation.

The Intel Array Visualizer online documentation provides detailed information for the software developer about the Intel Array Visualizer:

- Object model, including methods, properties, and events
- ActiveX\* controls
- Library routines

The Intel Array Viewer online documentation provides information about the Intel Array viewer user interface. To view the Intel Array Viewer online documentation, click **Help Topics** in the Intel Array Viewer **Help** menu.

## Intel Array Visualizer Documentation in HTML Format

The *release notes* for Intel Array Visualizer describe the latest information about Intel Array Visualizer software. To view the Intel Array Visualizer release notes, select Release notes from the Intel Array Visualizer documentation index

## Other Documentation

Other documentation files may be installed, such as the help files for tools. To access the help file for a tool, choose the appropriate item (such as Help Topics) from the tool's **Help** menu.

## 7 Intel® Fortran Technical Support

Intel® Fortran provides technical support primarily through your Intel® Premier Support account and related web site.

### Accessing Your Premier Support Account

If you purchased an Intel Fortran download kit, you are automatically registered and can access your Premier Support account with the account information you obtained when you purchased the downloaded version of Intel Fortran.

If you purchased the Intel Fortran CD-ROM version, register your purchase and activate your Premier Support account by opening the following internet URL in a Web browser:

<http://www.intel.com/software/products/registrationcenter/>

In addition to your name and related information, you need to provide the registration key (serial number) supplied with your Intel Fortran CD-ROM kit. Remember your username and password for your Intel Premier Support account, so you can obtain product updates and access technical support information. A new license file will be sent to you by email, which you should copy to your license directory (see "Activating the License File" in Chapter 2).

If you already have access to Intel Premier Support and to the product “Intel(R) Fortran Compiler, Windows” you do not need to re-register.

Once you have registered and obtained an Intel Premier Support User name and Password, you can access your Intel Premier Support account using a secure web site at:

<https://premier.intel.com/>

Your account lets you access timely compiler support information, including top known technical issues, software updates, FAQs, and other information.

### Guidelines for Reporting Problems

Before you report a potential problem, please use the following guidelines:

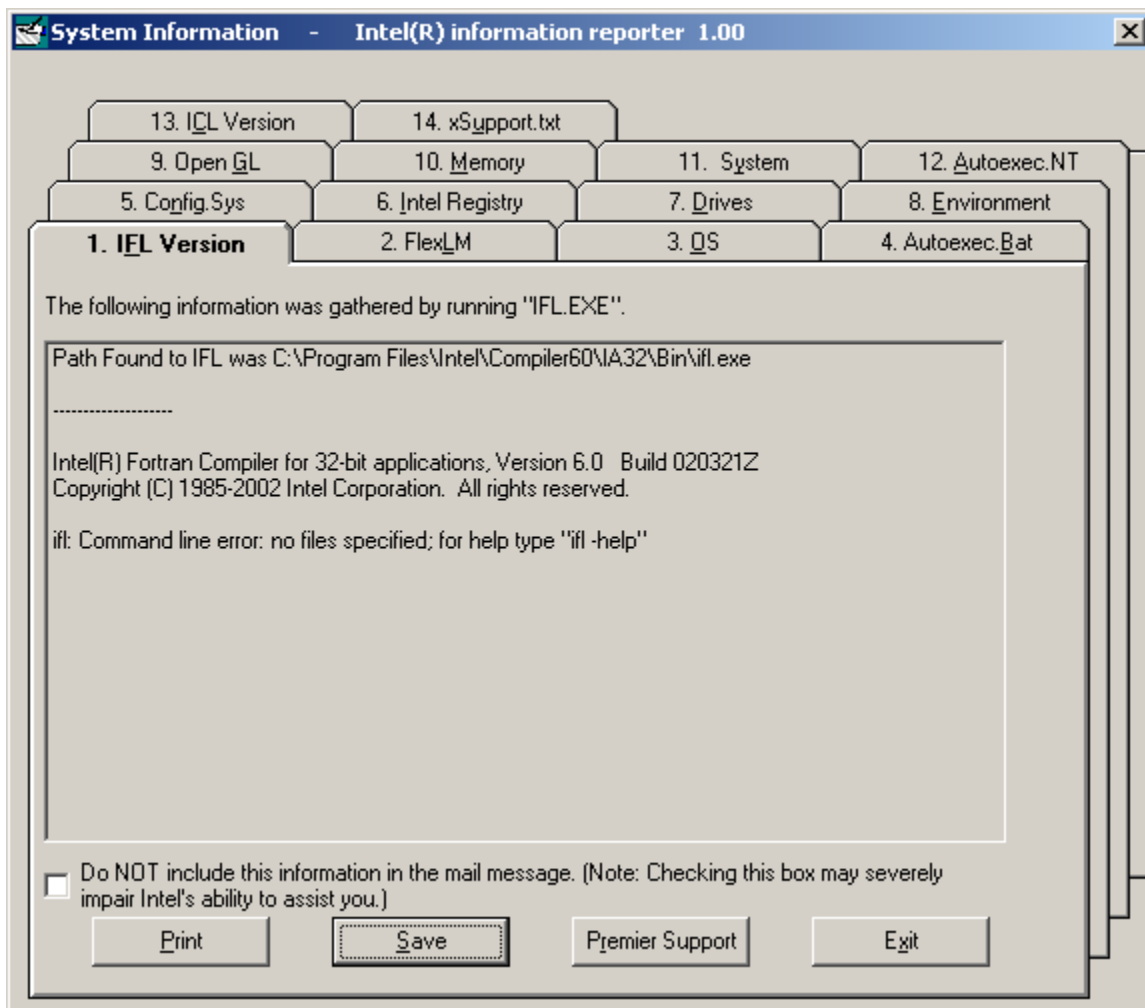
- Narrow down the problem to a small set of source code that reproduces the problem.
- Provide the exact error message that appears and when it appears.
- Indicate the compiler options used to reproduce the problem and any knowledge about which options are most relevant to the potential problem.
- You can use the Intel information reporter tool to gather system information, save it to a .txt file for later use. If you need to submit an issue using your Intel Premier Support account, you can attach the saved .TXT file to the issue.

- Make sure your Premier Support contact information is correct, especially your email address.

## Using the Intel Information Reporter Tool

The Intel information reporter is a tool installed with Intel Fortran that gathers system data from your Windows\* system (such as relevant registry information, environment variables, operating system name and version, compiler information) and writes it into an ASCII text file that can be attached in an email to Intel Technical Support.

The Intel information reporter tool is installed automatically with Intel Fortran and is an entry in the Registration and Support program subfolder. When you click Intel information reporter in the program folder, a screen resembling the following screen appears:





Although the Intel information reporter tool is primarily used to gather and provide information to Intel Technical Support, you can use this tool to capture information about your system at various times.

Click a tab to view its contents. The buttons at the bottom of the screen let you perform the following functions:

- To print this information to a printer, click the `Print` button. Select the appropriate printer and printer job options.
- To save the captured information to a plain ASCII .TXT file, click the `Save` button. Choose an appropriate directory and file name to save the file. The saved file path and name is also placed in your clipboard.
- To access the Premier Support Web site so you can log in, click the `Premier Support` button.
- To discontinue using the Intel information reporter tool, click the `Exit` button.

If you need to submit an issue using your Intel Premier Support account, you can attach the saved .TXT file to the issue.